A DISSERTATION ON

SURGICAL ASPECTS OF BULL GORE INJURIES

DISSERTATION SUBMITTED TO

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CERTIFICATE

This is to certify that the dissertation on surgical aspects of bull gore injuries is bonafide work, carried out in the Chengalpattu Medical College, Chengalpattu, during 2006-2009 by **Dr. M.RAJAKUMARI** under my supervision and guidance in partial fulfillment of the regulation laid down by the Tamil Nadu Dr. M.G.R. Medical University, for the M.S., General Surgery, Branch - I Degree Examination to be held in march 2009.

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CONTENTS

INTRODUCTION

Trauma can occur as a result of many causes and have multi various effects. Among these, in a country like ours, where agriculture is the main occupation for the large majority of the population, contact with cattle is to be expected in some degree and as a result of this contact, injuries are bound to occur.

The majority of these are managed at the primary care level but a substantial number of victims are still referred to the tertiary care centers. They may take the form of abdominal, thoracic, orthopedic or commonly, soft tissue injuries. So far there have been no studies that have attempted to analyze these injuries.

This study was undertaken with this in mind so that the various types of injuries and the age and sex distribution, hospital stay, in hospital outcome, mortality and morbidity and other factors can be analyzed to some extent. The study was conducted among the patients admitted with bull gore injuries in the Govt. Chengalpattu Medical College, Chengalpattu in the time period Dec. 2006 to June 2008.

DIAGNOSTIC MODALITIES

The history of the traumatic event is particularly imported in determining the likelihood of the organ injured. Upon arrival to the hospital, history and physical examination are usually accurate in determining intra-abdominal injury in the awake and responsive patient, although the limitations of the physical examination are significant. The test of choice depends on the homodynamic stability of the patient and the severity of associated injuries.

Patients with isolated penetrating abdominal trauma who are admitted hypertensive, in shock, or with peritoneal signs should go to the operating room despite the mechanism of injury. Stab wound victims without peritoneal signs, evisceration, or hypotension benefit from wound exploration and DPL.

Thoracic injuries suggestive of tension pneummothorax, cardiac tamponade etc., should have ICD insertion even before X rays are

taken. Orthopedic injuries are managed with the resuscitation of the patient in mind and then the requisite radiographs ordered.

PLAIN RADIOGRAPHS

The chest x-ray is a useful test to reveal pneumoperitoneum, abdominal contents in the chest (ruptured hemidiaphragm), or lower rib fractures. This later sign increases the probability of splenic and hepathic injuries. In cases of orthopedic injuries preliminary X rays are taken after the initial resuscitation of the patients.

An intravenous pyelography and a retrograde cystogram are useful tests in the evaluation of a trauma patient with hematuria. Occlusive views are useful in case of suspected maxillary or mandibular injuries.

X rays of the skull, lumbo sacral spine and cervical spine lateral view provide necessary information in patients presenting in an

unconscious state following a fall from height in bull gore injuries or after being thrown by the bull.

ULTRASOUND

Ultrasound has been used more frequently in recent years. The objective of ultrasound evaluation is to search for free intraperitoneal fluid. It can be done expeditiously, and it is as accurate as DPL in detecting hemoperitoneum.. It can also evaluate the liver and the spleen once free fluid is identified; however, that is not its main purpose. Portable machines can be used in the resuscitation area or in the emergency department in the hemodynamically unstable patient without delaying the resuscitation. Another advantage of ultrasound over DPL is its noninvasiveness. No further work-up is necessary after a negative ultrasound in a stable patient. CT scan of the abdomen usually follows a positive ultrasound in a stable patient.

The sensitivity ranges from 85 to 99%, and the specificity from 97 to 100%. USG can also be useful in determining effusion / hemarthrosis of the joints following the injury.

ADVANTAGES AND DISADVANTAGES OF ULTRASOUND

ADVANTAGES

Noninvasive

Does not involve use of radiation

Useful in the resuscitation room or emergency department

Can be repeated

Used during initial evaluation

Low cost

DISADVANTAGES

Examiner dependent

Obesity

Gas interposition

Lower sensitivity for free fluid <500 ml

Flase-negatives : retroperitoneal and hollow viscus injuries.

CT SCAN

The retroperitoneum is best evaluated by CT scan. The drawback of CT scan is that the patient needs to be transported to the radiology department and it is expensive compared with other tests. CT scan also evaluates solid organ injury and in the stable patient with a positive ultrasound, it is indicated to grade organ injury and to evaluate contrast extravasation. If contrast extravasation is seen, even in minor hepatic or splenic injuries, an exploratory laparotomy or, more recently, angiography and embolization are indicated. Another indication for CT scan is in the evaluation of

patients with solid organ injuries initially trated nonoperatively who are seen with a falling hematocrit. The most important disadvantage of CT scan is its inability to reliably diagnose hollow viscus. Usually, the presence of free fluid on CT scan without solid organ injury should raise the suspicion of mesenteric, intestinal or bladder injury, and an exploratory laparotomy is often warranted. The accuracy or CT scan ranges from 92 to 98% with low false – positive and false – negative rates.

In cases of spinal injuries CT scan and MRI plan an important role. CT scan of the brain may be needed to rule out intracranial bleed following a fall sustained by the bull gore. Similarly CT scan of the facial bones etc. may come in useful in the management of those patients with severe facial lacerations to find out if any fractures of the bony skeleton have occurred.

In patients with thoracic injuries once the acute stage has been managed, the CT scan may have a role to identify areas of lung contusion, parendhymal and mediastinal involvement. It assumes importance in the localization of loculated collection or abscesses that may be drained under image guidance or by marking the site and later intercostals drainage may be done as appropriate.

Advantages and Disadvantages of abdominal computed tomography scan.

ADVANTAGES

Adequate assessment of the retroperitoneum

Non operative management of sold organ injuries

Assessment of renal perfusion

Noninvasive

High specificity

DISADVANTAGES

Specialized personnel

Hardware

Duration : helical versus conventional

Hollow viscus injuries

Cost

Radiation exposure

MAGNETIC RESONANCE IMAGING

Though not of much of use in the acute care setting, the role of MRI in invaluable in the management of patients with spinal injuries when they have been injured by the bull. It may also have a role in defining deep hematomas but is hardly likely to be used for such a purpose. Retroperitoneal collection can be easily identified but CT provides the same information much faster and is cheaper too.

ADVANTAGES

Good soft tissue resolution

No radiation

Can be used in pregnancy

DISADVANTAGES

High cost

Time factor

Patient claustrophobia

Pacemaker and other implants in patients.

OTHER DIAGNOSTIC MODALITIES

The use of diagnostic laparoscopy in the trauma patient is very limited. It is an invasive and expensive method and does not seem to be superior to other methods used for decision making. Missed small bowel, splenic, and retroperitoneal injuries have been reported. It seems that laparoscopy is the best method to evaluate diaphragmatic injuries after thoraco abdominal penetrating injuries. Angiography is used to evaluate renal artery thrombosis, to manage pelvic hemorrhage in patients with pelvic fractures, and bleeding from minor hepatic and splenic injuries.

While the investigation to make the diagnosis and those affecting the treatment are being carried out, It must be borne in mind that the basic blood investigations and the rest must also be

simultaneously done and the patients' co-morbid conditions may warrant further investigations as dictated by the circumstances.

REREVIEW OF LITERATURE – PATHO PHYSIOLOGY AND MANAGEMENT

Grade	Type of Injury	Description of injury
I	Hematoma Laceration	Sub capsular < 10 % surface area Capsular tear < 1 cm parenchymal depth
II	Hematoma Laceration	Sub Capsular, 10-50% surface area, Intra parenchymal < 10 cm in diameter Capsular tear, 1-3 cm parenchymal depth < 10 cm in length.

III	Hematoma Laceration	Subcapsular >50% surface area, or ruptured subcapsular or parenchymal Hematoma, Intra parenchymal Hematoma >10 cm or expanding >3 cm parenchymal depth
IV	Laceration	Parenchymal disruption involving 25 – 75% hepatic lobe or 1-3 Couinaud segments
V	Laceration Vascular	Parenchymal distribution involving > 75% of hepatic lobe or > 3 Couinaud segments with in single lobe Juxta hepatic venous injuries i.e., retro hepatic vena cava / central major hepatic veins.
VI	Vascular	Hepatic Avulsion

GRADING OR HEPATIC INJURIES

(Liver injury scale 1994 revision)

* advance one grade for multiple injuries up to grade III

LIVER INJURIES

Liver is frequently injured in both blunt and penetrating trauma. Because of its size, injuries sufficient to lacerate liver are associated with injuries to other organs in about 80% cases. 85% of liver injuries are not bleeding at the time of laparotomy and patients tolerate these in injuries very well. Most liver injuries will in fact require only documentation and no drainage. The minority of liver injuries therefore require definitive surgical care. The history of injury is helpful in that, any penetrating injury to the right rib cage or upper abdomen and a patient, being in shock at the scene following blunt trauma abdomen; should be suspected of having a major liver injury.

After resuscitation of the patients, plain x-ray abdomen should be taken. It may show altered liver border, hemoperitoneum and associated rib fractures. Abdominal paracentesis is positive, if a large amount of blood is present in the peritoneal cavity. DPL is diagnostic of minimal hemo peritoneum, but not specific for liver injury. CT is the investigation of choice in the multiply injured patient, provided

the patient is hemodynamically stable. Radionuclide scans are rarely done to document the location of biliary fistula after the repair of hepatic injuries.

TREATMENT

I. NON OPERATIVE MANAGEMENT

It is indicated in

1. Hemodynamic stability
2. Normal mental status
3. Absence of a clear indication for laparotomy such as peritoneal signs
4. Low grade liver injuries (grade 1 to 3) and
5. Transfusion requirements of less than 2 units of blood.

These patients were followed by serial hematocrit and vital signs. During observation if the patient shows signs of bleeding, angiography and selective embolisation can be done.

Indications for laparotomy during observation are

1. Continuing need for blood transfusion
2. Deteriorating vital signs
3. Peritoneal signs
4. Progressive expansion of Hematoma and
5. Hematoma thought to represent a septic focus.

II. OPERATIVE MANAGEMENT

A. Simple Techniques of repair

1. Drainage of non bleeding injuries is rarely performed nowadays
2. Compression: Small cracks in the capsules can be treated by compression for 5 to 10 minutes to stop bleeding.
3. Topical agents: The application of gel foam, microcrystalline collagen pad or fibrin glue is used when avulsion of Glission's capsule is present. After application of topical agent to the raw hepatic surface, compression is applied with pads for 5 minutes. After removal of pads, electrocautery can be used for any bleeders.

4. Suture hepatorrhaphy: Horizontal mattress sutures with 1 – 0 vicryl or simple continuous suturing with 1/0 vicryl can be done – with these measures most of the bleeding stops.

B. Advanced Techniques of Repair:

1. Extensive hepatorrhaphy:

If simple suturing fails to stop the bleeding, multiple horizontal mattress sutures can be placed; but bleeding from the intra lobar branches of the hepatic artery, portal vein or hepatic vein is not controlled by this method.

2. Hepatotomy with selective vascular ligation:

It is indicated when bleeding vessels are situated deeply. Hepatotomy is done with finger fracture technique. Bleeding vessels and biliary radicals are identified and ligated.

3. Omental Pack:

In 1975 stone and lamp first described the use of viable pedicle of omentum placed into deep lobar lacerations to control hemorrhage at the base. Viable omentum separated from the transverse colon

can be placed over liver lacerations to control bleeding, especially in the bare area of liver.

4. Resection & debridement with selective vascular ligation:

It is indicated whenever there is friable and partially devascularised hepatic tissue on the edge of liver or in a hepatic laceration. It is used in preference to anatomic segmentation or lobectomy, as these techniques frequently sacrifice larger amounts or normal hepatic tissue.

5. Resection:

It is indicated in the case of total disruption of a lobe or segment in the form of lobotomy or segmentectomy.

6. Selective hepatic artery ligation:

When selective vascular ligation fails, ligation of the hepatic artery is an alternative. It may produce drameatic hemostasis without subsequent liver failure, but this should be done as close to liver as possible and only as a last resort.

7. Peri hepatic packing:

This technique involves the insertion of laparotomy pads or rolls of gauze around the injured liver but not into the hepatic laceration. Packs can be removed 12 hrs after packing. Re-bleeding and sepsis are common complications.

8. Drainage:

Open Penrose drainage has been used after operative treatment but incidence of intra abdominal sepsis is common.

Complications:

Significant complications following liver injury include

1. Pulmonary complications
2. Coagulopathy
3. Hypo glycemia
4. Jaundice
5. Biliary fistulas

6. Haemobilia and

7. Sub diaphragmatic and intra parenchymal abscess formation

SOFT TISSUE INJURIES

Bull gore injuries are defined as lesions from collision with bullgores.

They are classified as

A. Lance

Contusion resulting from horns transversal collision.

B. Puntazo

a light horn puncture wound or scratch, involves skin and subcutaneous tissue.

C. Cornoda

Goring small entry involving muscles and body cavities.

D. Cornoda despistante

Misleading goring entry wound is far away from the most significant area.

E. Cornada envainada

Penetration goring deep injury with severe internal lesions without structural continuity in the skin.

DISTRIBUTION OF INJURIES BY ANATOMICAL SITES

SITE	TOTAL NO PTS	PERCENTAGE
Head & Neck	16	15.8
Thorax	14	13.9
Abdomen	25	24.8
Perineum & Genitalia	37	36.6
Extremities	8	8.9
Total	100	100

Injuries to the abdomen & Perineum were significantly higher than other sites ($P<0.05$).

Wounds were graded from severity based on the extent of the injury no patient had more than one injury indicating that the animal gored the patient only once.

Severity grading of wounds

None	No evidence of external injuries
Mild injury	Penetrating or non penetrating wounds involving skin and subcutaneous tissue.
Moderate injury	Wounds involving muscles, simple fracture of bones.
Severe injury	Wounds involving viscera, major vessels or compound fracture.

Nature of injuries

Injuries may occur in any age group injuries to the abdomen and perineum accounted for 61% of all injuries. Wounds are directed obliquely upwards.

The reason is that when the bull attacks it charges with head low and the horn leading the part of the body most likely to be injured is the abdomen and perineum.

Management of injuries

Treatment administered are classified as

1. Non surgical (wound dressing, blood and fluid transfusion)
2. Minor surgical (Wound debridement, suturing of wounds, open reduction of fractures, pleural space drainage and suprapubic cystotomy).
3. Extensive surgical treatment (lapratomy, craniotomy, thoraccotomy, vascular repair.)

Treatment	Total No of Pts
Non Surgical	23
Less extensive surgical	43
Extensive surgical management	34

Wound infection

Wound infection occurred is 13% (95% confidence interval of 5.9 to 19.7%) twelve of these occurred in wounds that were primarily sutured even though primary suturing was done after adequate debridement, and cleaning and under antibiotics cover of the sixteen wounds that were secondarily sutured, wound infection developed is only one.

Twelve out of 29 cases that were primarily closed had developed infection. Nine wounds that were less than six hours old were closed primarily of these three developed infection.

Delay between injury and treatment was less than six hours in 28 cases and 6-24 hours in 38 cases, more than 24 hours in 23 cases.

	No. of Cases	Wound infection
Primary suturing	29	12
Secondary suturing	16	1

Wound infection was common especially for wounds closed primarily (12.9%)

In secondarily closed 6.3% (low)

Therefore wounds should be closed by secondarily suturing even when the injuries less than six hours old.

Bull horn injuries are highly polluted due to the presence of germs along the horns and environment and consequently it is crucial to

complete tetanus prophylaxis and to use broad spectrum antibiotics at therapeutic does.

Finally success when treating the type of injury is based on

1. Early diagnosis
2. Appropriate surgical handling
3. Appropriate antibiotic cover according to culture sensitivity
4. Tetanus prophylaxis.

GASTRIC INJURIES

Injuries of the stomach are common in penetrating trauma but very rare in blunt trauma. The stomach is intra thoracic, partially protected by rib cage and any penetrating wound in this area should be suspected of causing injury to stomach. After resuscitation, a nasogastric tube si placed that serves both diagnostic and therapeutic functions. The return of gross blood on nasogastric aspirate is suggestive of an upper gastrointestinal injury.

Haematemesis or bright red blood per nasogastric tube was present in (45% of bull gore injuries in series of patients with gastric

injuries treated. The nasogastric tube serves a therapeutic function by decompressing stomach.

OPERATIVE MANAGEMENT

The intra operative evaluation of stomach injury includes good visualization of the hiatus, evaluation of the anterior portion of the stomach, division of the posterior aspect of the stomach. Penetrating wounds are debrided and primary closure is performed. Injuries with major tissue loss may best be treated by gastric resection. Post operative complications include.

1. Bleeding – usually from the submucosal vessels

2. Intra abdominal abscess and more rarely
3. Gastric fistulae

DUODENTAL INJURIES

The majority of duodenal injuries are caused by penetrating trauma. The incidence of duodenal injuries varies from 3% to 5%. Most of duodenal injuries are accompanied by other intraabdominal injuries.

DIAGNOSIS OF DUODENAL INJURIES

Serum amylase is sensitive but unfortunately not specific for duodenal injuries. Needle paracentesis or lavage will often be positive for blood, bile or bowel contents.

Plain films of the abdomen shows

1. Mild scoliosis
2. Obliteration of the right psoas shadow
3. Absence of air in the duodenal bulb and / or
4. Air in the retroperitoneum outlining the kidney

Other investigations include gastrografin upper gastrointestinal serial and CT of the abdomen.

Grade *	Type of Injury	Description of Injury
I	Hematoma Laceration	Involving single portion of duodenum Partial thickness, no perforation
II	Hematoma Laceration	Involving more than one portion Disruption < 50% of circumference
III	Laceration	Disruption 50% to 75% of circumference of D2. Disruption of 50% to 100% of circumference of D1, D3 or D4.
IV	Laceration	Disruption of >75% of circumference of D2 involving ampulla or distal common bile duct.
V	Laceration Vascular	Massive disruption of duodeno pancreatic complex Devascularisation of duodenum

* - Advance one grade for multiple injuries up to Grade III.

Treatment

Intra operative evaluation of the duodenum requires an adequate mobilization of the duodenum by means of a Kocher's maneuver. 80 to 85 % of duodenal wounds can be primarily repaired. The remaining 15 to 20% are severe injuries that require more complex procedures.

In minor injuries (Grade I & II) diagnosed within 6 hours of injury, a simple primary repair is suitable. After 6 hours, the risk of leak increases and some form of duodenal decompression like transpyloric nasogastric tube, tube jejunostomy, tube duodenostomy is advisable.

Grade III injuries are best treated by primary repair, pyloric exclusion and drainage; or alternatively roux-en-Y duodenojejunostomy.

Grade IV injuries are treated by primary repair of the duodenum, repair of the common bile duct and placement of T-tube with a long transpaillary limb or a choledochoedteric anastomosis can be performed.

Grade V injuries are best treated by pancreatico duodenectomy. The Most common complication after duodenal injury is the development of a duodenal fistula.

PANCREATIC INJURIES

Pancreatic injuries are rare accounting for 10% to 12% of all abdominal injuries. The great majority of such injuries are caused by penetrating injuries. Major abdominal vascular injuries are present in more that 75% of cases of penetrating pancreatic trauma. Fistula, pseudocyst, pancreatitis, anastomotic leak and intra abdominal abscess occur in 1/3rd of the patients 10 to 25 % mostly due to associated intra abdominal injuries.

GRADING OF PANCREATIC INJURY

Grade *	Type of Injury	Description of Injury
I	Hematoma	Minor contusion without duct injury
	Laceration	Superficial laceration without duct injury
II	Hematoma	Major contusion without duct injury or tissue loss
	Laceration	Major laceration without duct injury or tissue loss
III	Laceration	Distal transaction or parenchymal injury involving ampulla
IV	Laceration	Proximal transaction or parenchymal injury involving ampulla
V	Laceration Vascular	Massive disruption of pancreatic head.

* - Advance one grade for multiple injuries up to Grade III

Diagnosis of pancreatic injuries

1. Increased level of serum and urinary amylase after blunt injuries is not diagnostic, but a persistent elevation suggests pancreatic injury.
2. Contrastduodenography may reveal widening of the “C” loop.
3. Abdominal CT scans are currently reported as having a sensitivity and specificity in excess of 80% (Jeffrey RE et al, 1983)
4. ERCP is the most useful investigation in pre operative delineation of ductal anatomy in patients with delayed presentation or missed injuries.

Treatment

Pancreatic injuries are divided into proximal & distal according to the location on the right and left of the superior mesenteric vessels, respectively.

1. Penetrating wounds to the right of the superior mesenteric vein should be treated with debridement and direct suture ligation of areas of bleeding.
2. Extensive injuries to the pancreatic head or to the right of superior mesenteric vessels are best treated by external drainage.
3. Severe trauma to the duodenum and head of pancreas may be treated with debridement of the pancreas, closure of the duodenal wound and pyloric exclusion with external drainage.
4. Most distal pancreatic injuries with suspected ductal injuries are treated by distal resection with or without splenectomy.

The most common complications after pancreatic trauma are pancreatic fistula and peripancreatic abscess.

SMALL BOWEL INJURIES

Injuries of small bowel are present in approximately 25 to 30% of the patients who require laparotomy after penetrating trauma (Cuschiere, Moosa et al). In most patients who sustain injury, the small bowel is spared because the mobility of small bowel afforded by the fedundant mesentery, allows the intestine to slide away from a gore of the bull.

EVALUATION AND DIAGNOSIS

Although history and physical examination are valuable in the diagnosis of small bowel injury following penetrating trauma, investigations may help.

1. Plain films of the abdomen may reveal free air
2. Any patient who has peritoneal signs or is hemodynamically unstable, proceeds promptly to exploratory laparotomy. In equivocal cases diagnostic peritoneal lavage is employed. Indicators of hollow visceral injury (DPL) include

   a. Presence of bacteria, food fibers or bile and other criteria like

   b. Amylase greater than 200 units / L,

   c. WBC > 500/mm^3 of fluid and

d. RBC > 1,00,000/mm^3 of fluid

Treatment

At laparotomy, a careful examination of the entire small bowel should be performed. Bleeding should be initially controlled and clamps or sutures should be applied to prevent further leakage of intestinal contents into the peritoneal cavity.

Small tears are closed primarily while extensive lacerations, devascularised segments or multiple lacerations in a short segment of bowel are better treated by resection and reanastomosis.

Complications include

1. Intra abdominal abscess,
2. Anastomotic leakeage,
3. Entero cutaneous fistula and
4. Intestinal obstruction.

COLONIC INJURIES

Colon injuries are usually the result of penetrating trauma. The colon is the second most frequently injured organ in bull gore injuries and the to the abdomen. Morbidity rates after colonic injuries vary from 20% to 35% and mortality rates from 3% to 15%. Because of colon loaded to bacteria and taeealmatenal.

Treatment

General criteria for primary repair include

1. Early diagnosis (within 4 to6 hrs)
2. Absence of prolonged shock or hypotension
3. Absence of gross contamination of the peritoneal cavity
4. Absence of associated colonic vascular injury
5. Less than 6 units of blood transfusion
6. No requirement for the use of mesh to permanently close the abdominal wall.

Injuries to the colon with minimal contamination and hemodynamic stability can be managed by primary repair.

High risk colon injuries and those associated with severe injuries will benefit from resection and colostomy.

Post operative complication

1. Abscess formation
2. Anastomotic leak
3. Para stomal hernia
4. Morbidity and mortality associated with colostomy closure

RENAL INJURIES

Penetrating trauma accounts for 84 % of renal injuries. Injuries to the kidney are associated with a high incidence of non renal injuries. The overt mechanism of renal injury from penetrating trauma is the obvious tissue disruption to the parenchyma, collecting system and vasculature.

Diagnosis

History is very important. A high index o suspicion should be there – flank pain and hematuria warrant evaluation regardless of the

apparent location of trauma. Ground glass densities in the flank suggest urinary extravasation or Hematoma or pre existing mass such as hydronephrosis or tumor. Infusion pyelography identifies approximately 80% renal injuries.

Renal injuries is suggested by the following radiological findings

a. Decreased excretion of contrast
b. Obliteration of psoas shadow or renal outline
c. Scoliosis away from the injury
d. Extravasation of the contrast.

A normal IVU with hematuria in a trauma patient suggests minor renal contusion and rules out major renal injury. Incomplete or poor visualization of a portion of kidney suggests major renal trauma, including deep laceration, avulsion or vascular occlusion. Non visualization of a kidney on pyelography requires immediate arteriography whenever possible. CT is very useful investigation helpful in the non operative management.

Treatment

Surgical exploration of all penetrating renal injuries is recommended because of the high incidence of associated intra abdominal injuries.

- Penetrating wounds causing small parenchymal injuries are generally treated with debridement, primary repair and drainage.
- More extensive wounds may require partial or even total nephrectomy.
- Injuries involving the hilum are seldom repaired primarily and in most circumstances a total nephrectomy is necessary.
- Renal vein laceration may be repaired by venorrhaphy. Renal arterial trauma may require a variety of repairs viz. lateral alteriorrhaphy, arterial resection and repair by primary reanastomosis or autologous vein repair.

URETERIC INJURIES

The following classification of ureteral injury helps in organizing the management of ureteral injury.

1. Site : upper, middle and lower third
2. Time of recognition : immediate or delayed
3. Nature of Injury : Penetrating trauma

4. Presence of concomitant injuries

Injury to the ureter is uncommon and occurs mostly after penetrating trauma. The presence of hematuria in ureteral injury is an exception rather than the rule.

Diagnosis of ureteral injury

In the majority of cases, intra venous pyelography will confirm the diagnosis. In 15% to 20% of ureteral injuries a retrograde ureterography will be required to confirm the diagnosis. In hemodynamically unstable patients the diagnosis of ureteral injury may be made at the time of laparotomy by intravenously injecting 5ml of methylene blue. CT scan is more accurate in detecting the extravasation preoperatively.

Management

The principles of ureteral repair are

1. Adequate debridement,

2. Tension free repair,

3. Spatulated anastomosis,

4. Waterthght closure,

5. Ureteral stenting and

6. Drainage

Uretero pelvic junction disruption and major ureteral injures (greater than 2cm laceration) are best treated by nephrostomy and stent after repair with fine chromic catgut sutures. Drainage should be provided.

Lower ureteral injuries usually require tunneled reimplantation into the bladder; if this is nor possible then a flap should be turned cephalad for reconstruction (Boari and Ockerland's flap). When major ureteral loss is present or when it is necessary not be have any ureteral leakage post operatively, one may ligate the ureter and perform nephrostomy either at that time or per cusaneously within 24 hours, then later doing a transuretero – ureterostomy, Alternatively one may choose substitution of a segment of tapered or non tapered ileum for the ureter.

Nephrectomy may be the procedure of choice when there is simultaneous injury to the colon, ureter and iliac artery or aorta.

RETROPERITONEAL NEMATOMA

The exact incidence of retroperitoneal Hematoma in patients who have suffered penetrating abdominal injuries is usually not recorded, as the hematomas are simply a manifestation of a major vascular injury.

In general, trauma surgeons recognize retroperitoneal Hematoma in five location viz.

1. Midline suprarenal
2. Midline infra renal
3. Lateral peri renal
4. Lateral pelvic and
5. Portal

Anemia and hematuria are constant findings in patients with retroperitoneal Hematoma from pelvic fractures, while hematuria is much less common in patients with hematomas caused by wounds involving vascular structures. In contrast to the management of

retroperitoneal Hematoma with abdominal trauma, all five retroperitoneal hematomas previously listed are opened in patients with penetrating wounds. In each instance, proximal vascular control and if possible, distal vascular control should be done before entering the Hematoma.

THORACIC INJURIES

Thoracic trauma forms about 10% of all trauma cases. Associated orthopedic injuries and head injuries are common. In most accidents, the patient is caught unawares. Medical relief is rarely available. Even if it is available, it may nor be any more htan just first aid. Also the centre where the patient is first taken is usually not equipped to handle profuse bleeding, respiratory failure etc.,

Chest trauma patients are likely to deteriorate due to the effects on respiratory function with secondary associated cardiac dysfunction. The aim of treatment in chest trauma cases is restoration of cardio respiratory function to normal, control or bleeding and prevention of sepsis. This statement is simple but requires several steps to be taken. Unfortunately deaths are due, in many cases, to airway

obstruction and disturbances in physiology due to hemothorax, pneumothorax with or without flait chest.

About 15% of patients need surgical intervention, whereas measures to relieve hemo pneummothorax offer life saving benefits. Recognition of the need for ventilatory support in such patients is delayed in the receiving centres where it is vitally required. A tube thoracostomy and ambu bag breathing kit may save many patients.

Management

Management of chest injured begins at the site of injury. Breath sounds when diminished or absent, denote lug injury pneummothorax or hemothorax. Bowel sounds, if heard, generally exclude intestinal injury. Bruises over left upper part of abdomen, if present, denotes splenic injury. For central nervous system the site of injury, bleeding from ears, uequal pupils, inability to move limbs, consciousness etc. must be examined. The spine should be checked for injury. If the abdomen is distended, a Ryle's tubeis inserted. X – ray chest should be taken to check for fractured ribs, hemothorax or pneummothorax. Intravenous fluid therapy must be started.

In case of pneumo or hemoghorax, it is life saving to insert an intercostals drainage tube. It can be done using a tube of any size, connected to any bottle with an under water seal. One can use an IV set also. One can measure blood loss, at hourly intervals and replace the same with appropriate blood transfusion. If blood loss is large, it should be measured every half hour and the amount drained provides information for further steps to be taken. Surgical intervention in indicated to control bleeding if the patient is having persistent haemoptysis leading to flooding of lungs.

FLAIL CHEST:

Flail chest is usually evident if there is:

1. Fracture of 4 or more ribs anteriorly and posteriorly
2. Bilateral anterior rib fractures
3. Sternal and rib fractures
4. Fracture of 7 to 8 ribs antero laterally
5. Costochondral fracture of 4-5ribs

The effects of flail chest can be immediate or delayed like

1. Paradoxical movement
2. Hypotension
3. Retained secretions
4. Atelectasis
5. Mediastinal flutter

Flail chest management should include

1. Strapping / sand bag support,
2. External fixation with towel clips / pulley and traction,
3. Internal fixation with wires / plates and
4. Positive pressure ventilation

General measures in all forms of chest injuries include:

1. Analgesics and antibiotics
2. Oxygen by mask; if patient is hypoxic, manual ventilation must be considered
3. Appropriate intercostals drainage tubes
4. Arterial blood gas measurements
5. Intercostal block / epidural block
6. Chest physiotherapy
7. Repeated bronchoscopic suction

8. Mini tracheostomy

Indications for ventilatory support are;

1. Tachypnoea
2. Shock
3. Cyanosis
4. Pao2 < 60mg Hg
5. PaCO2 > 50 mm Hg

Ventilatory support is indicated in patients with lung contusion, Hemo or pneummothorax, Flail chest with falling blood pressure, increasing pulse rate, low PO2 and rising PCO2. Manual ventilation is sometimes beneficial in such patients.

Morbidity and mortality depend on:

1. Severity of the chest injury
2. Condition of the underlying lung
3. Associated head injury
4. Associated abdominal injury
5. Long bone fracture / fat embolism.

Mortality rate varies from 20 – 80 %, mostly as a result of associated injuries.

Complication of prolonged ventilation include:

1. Infection / bed sores / deep vein thrombosis
2. Baro trauma / persistent pneummothorax
3. Thoracic trauma
4. Ventilator dependency
5. Tracheostomy
6. Tracheal stenosis

If chest injury is the only injury present – one must look for

1. Cardiac tamponade,
2. Injury to great vessels and
3. Injury to bronchi and exophagus

Cardiac Tamponade

It is more common in penetrating injury. Beck's triad (low BP, increasing JVP, muffled heart sounds) is noticed in <30% of cases.

X-ray chest may show enloarged cardiac shadow. Clinical suspicion, Echocardiography and pericardiocentesis are useful.

Surgery:

Surgical intervention / exploration is required if the penetrating injury is close to the heart, great vessels, with persistent bleeding and suspicion of cardiac tamponade. Median sternotomy and left anterolateral thoracotomy are the preferred approaches. Delayed surgical intervention is required for removing clotted blood from pleural cavity or clotted hemothorax and empyema. Usually (in about 70% of patients) conservative management is sufficient to save life.

Chest trauma, though a major entity, can be managed, if altered physiology consequent to the injury is understood. As in all trauma cases, interval from time of injury to reaching medical aid is vital. Oxygen supply to the lung and inter costal drainage are of vital importance. Comprehensive examination of injured person for physical status and associated organ injuries is vital. Stabilization of chest wall is essential.

PERINEAL INJURIES:

Diagnosis:

1. Physical Examination rectal examination should be performed.
2. It is an essential part of an examination – 99% fresh blood noted.
3. Proctoscopy
4. Anoscopy sigmoidoscopy
5. Visualisation (Or) Palpation of the rectal defect. It is the difinitive means of rectal injury.

Rectal Injuries:

- 95% of rectal injuries caused by penetrating injuries
- Rectal injuries classified by hass and fox into 3 types accordign to anatomy and pathalogy.
    i. Intra peritoneal

ii. Extra Peritoneal

iii. Sub Peritoneal

Grading a Injuries:

		Description of Injuries
I	Hematoma Laceration	Contusion or haematoma without devas partial – thickness laceration
II	Laceration	Laceration < 50% of circumference
III	Laceration	Laceration > 50% of circumference
IV	Laceration	Full-thickness laceration with extensin
V	Vascular	Devascularized segment
Advance one grade for multiple injuries up grade III		

Treatment:

a. Loop colostomy

b. Loop colostomy with closure of the distal end

c. End colostomy (sigmoid) mucous fistula

d. Hartman's proceudre

e. APR

Control of heamorhage had the highest priority at lapratomy single (or) double layred closure with variety of suture materials for wounds involved both intra extraperitioneal rectal injuries.

Complications:

i. Abdominal (or) pelvic abscess

ii. Recto cutaneous fistula

iii. Wound infection

iv. Peristomal evisceration

v. Small bowel fistula

AIM OF THE STUDY

a) To find out the **pattern of surgical injuries** in victims of bull gore injuries

b) To analyze the **characteristics of the injured** population with regard to

1. Age
2. Sex
3. Duration of stay
4. Nature of the injured
5. Organs injured
6. Type of injury
7. Management

c) To assess the in hospital outcome of these injuries

d) To assess the mortality & morbidity

MATERIALS AND METHODS

This study was conducted in the Chengalpattu Medical College & Hospital December 2006 to June 2008 and included all cases of bull gore injuries admitted to the trauma ward of our hospital during the above time period.

On admission, the case history viz. name, age, sex and mode of injury were elicited. The patient was then subjected to appropriate investigations. Hemoglobin estimation, urinalysis, blood grouping & typing and hematocrit measurement were done. Renal parameters like blood urea and serum creatinine were measured. Appropriate radiographs were taken and USG, CT or MRI were done later as dictated by the need of the particular case.

The patients were grouped with regard to their injuries which were classified as

1. Skin & soft tissue injuries
2. Chest injuries
3. Abdominal injuries
4. Orthopedic injuries
5. Other with the injury coding being assigned to each case.

Soft tissue abrasions were cleaned and dressing applied, while lacerations were thoroughly washed and then primarily closed by vertical mattress sutures in most areas except in face where simple sutures were used. Contusions were managed expectantly while hematomas were aspirated. Extensive lacerations were allowed to granulate and later grafted.

Patients with thoracic injuries had a radiograph of the chest PA view after a good clinical examination.

Criteria for ICD insertion

1. Hemothorax
2. Pneumothorax
3. Flail Chest

4. Multiple rib fractures

Cases with isolated rib fractures without any evidence of pleural breach and blunt injuries to the chest were managed expectantly with analgesics & observed without ICD insertion.

ICD removal was done after complete re expansion as monitored by serial radiographs. If the need arose CT chest was done to drain loculated collections.

All patients with an injury coding 3 i.e., abdominal injuries were evaluated with plain x-rays of the chest and abdomen and USG & CT if required.

Indications for laparotomy:

1. Abdominal guarding, rigidity & other signs of peritonitis
2. Hemodynamic instability
3. Bowel evisceration
4. Peritoneal breach
5. Pneumoperitoneum

6. Moderate or large fluid collection on USG
7. Solid organ injuries suspected or proved by imaging

Wounds that did not involve a peritoneal breach were suture closed after exploration under local anesthesia and observed and if any or the above signs appeared then laparotomy was done.

During laparotomy, small bowel lacerations were closed primarily, with resection being reserved for cases that had multiple lacerations in short segments or where there was vascular was gross contamination of peritoneal cavity or vascular compromise. Liver lacerations were approximated by mattress sutures using absorbable suture materials with / without an omental patch. In cases of evisceration of bowel without any other organ injury, the prolapsed bowel was washed and after a thorough laparotomy the same was returned to the abdomen. Retrioeritoneal hematomas were left alone during surgery unless they were expanding.

Among orthopedic injuries, closed undisplaced fractures were managed by POP application. External fixation was done if they were communited or of the open type. Fractures of the femur were treated

with pin traction initially and a definitive procedure was done at a later date. Clavicle fractures were managed with figure of eight bandage application while pelvic fractures were managed expectantly. Spine stabilization was done for all cases suspected of having spinal injuries.

The operative findings were recorded and the patient was followed up till his discharge from the hospital. The occurrence and type of complications was duly noted. In case of death the post mortem findings were obtained. The above were recorded in the pro forma prepared for this study. The data that was gathered in this fashion was then analyzed with regard to various parameters and the results were thereby obtained.

OBSERVATION & RESULTS

A total of 105 patients were admitted with injuries sustained directly or indirectly as a result of bull gore in the Chengalpattu Medical College & Hospital, Chengalpattu during the period of study. The data was analyzed with regard to various parameters viz. age & sex distribution, type of injury, organs injured, duration of stay, management and outcome.

AGE DISTRIBUTION

The analysis revealed that most of the injured were in the productive age group with 41% of persons being in their twenties. Among the rest 17% were in their teens and 16% in their thirties with about 26% beyond forty years of age.

Age Range (Years)	Distribution	Percentage
11 – 20	18	17
21 – 30	43	41
31 – 40	17	16
41 – 50	16	15
51 – 60	4	4
61 – 70	7	7

SEX DISTRIBUTION

Not surprisingly there was a predominance of females among those injured with Males accounting for only about 40% of cases. This is primarily because bull gore injuries occurred in Female. Who contact with cattle to be more.

Sex	Distribution	Percentage
Male	49	40
Female	66	60

TYPE OF INJURY & INJURY CODING

The patients were studied with regard to their injuries which were grouped as

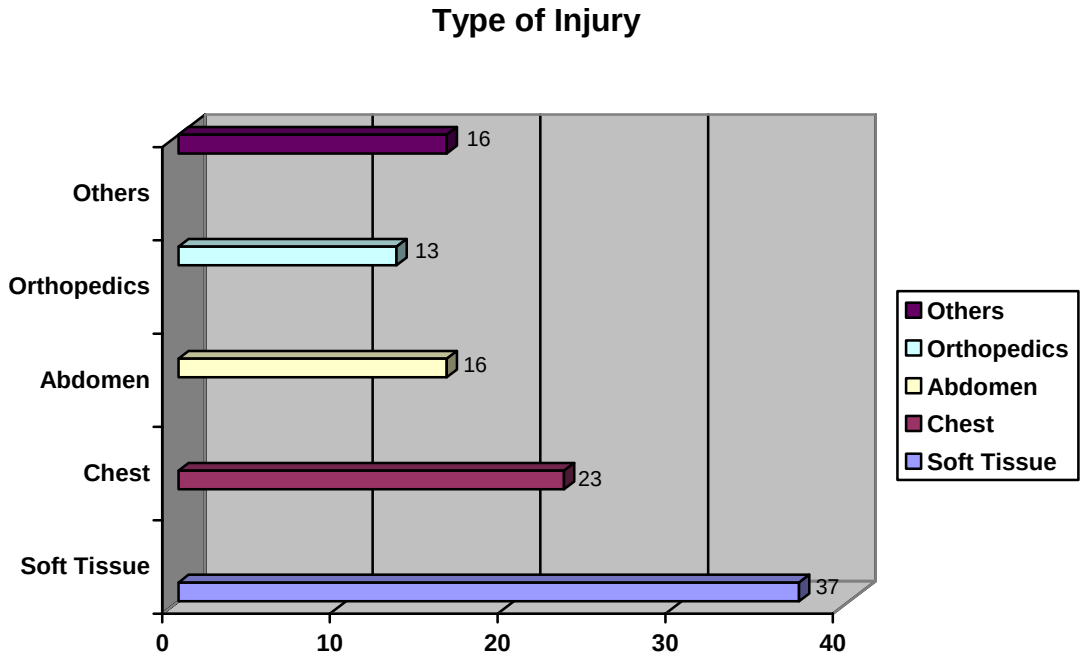
1. Skin & soft tissue injuries
2. Chest injuries
3. Abdominal injuries
4. Orthopedic injuries
5. Other injuries

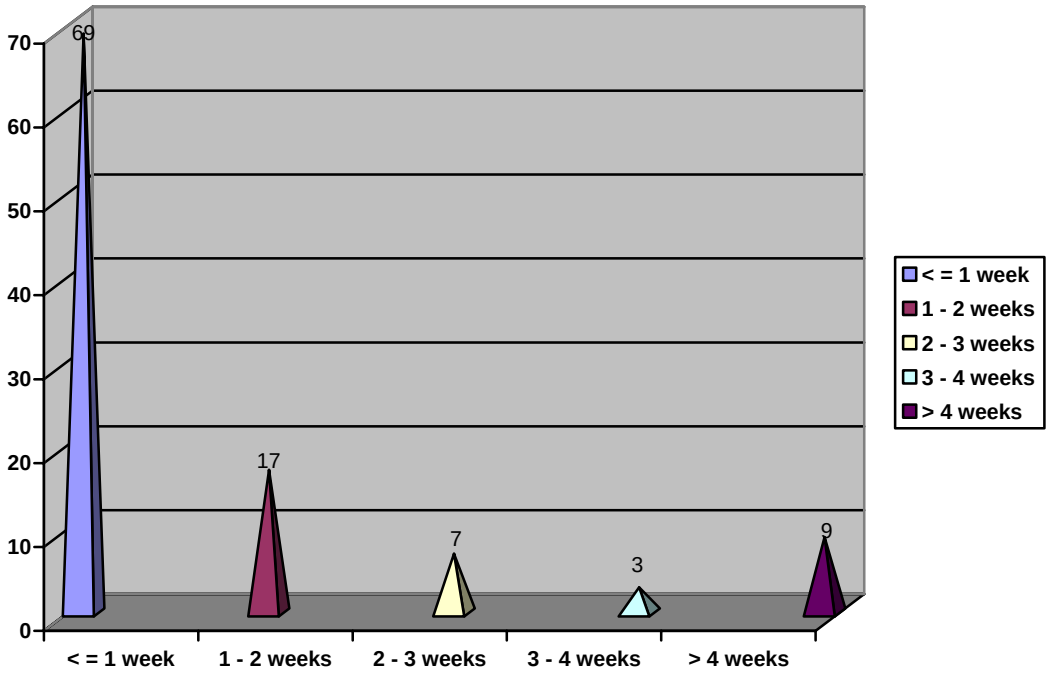
With injury coding being as mentioned above. Skin & soft tissue injuries were the commonest accounting for 35% of cases, with thoracic injuries accounting for 22% of cases. Abdominal and orthopedic injuries accounted for about 15% each. Though soft tissue injuries were the main cause of admissions they were the least morbid of the injuries.

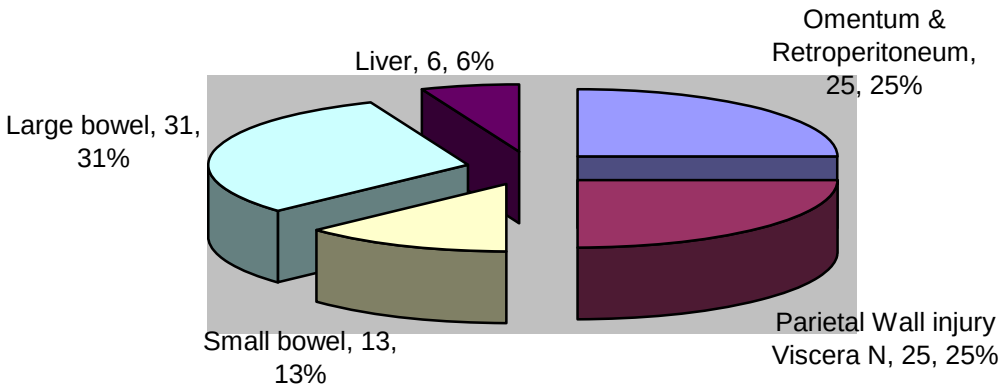
Type of Injury	Numbers	Percentage
Soft Tissue	37	35
Chest	23	22
Abdomen	16	15
Orthopedics	13	13
Others	16	15

Among the abdominal injuries large bowel injuries constituted 31% with three ascending colon injuries, one transverse colon injury an done in the sigmoid. There were two small bowel injuries (one in the ileum and the other in the jejunum). There were four cases of

parietal will injury with all organs and viscera being normal. There was one liver injury and in four cases, the mesentery or omentum was involved.







The thoracic injuries were primarily in the form of rib fractures with hemo / pneumothorax. Out of the 23 chest injuries, 11 cases needed

an ICD for their management while the rest were expectantly managed.

Fractures involving the femur accounted for 4 cases of orthopedic injuries, those of the legs for 3 cases while the upper limb, the spine and the public rami were six cases that needed plastic surgical suturing, two scrotal lacerations, two dental and two vascular injuries.

DURATION OF STAY

Of the 105 admitted patients, 69 (66%) were discharged within a week, 17 (16%) people within two weeks while 19(18%) had a hospital stay beyond 14 days. Of these not surprisingly five people with bowel injuries and six with orthopedic injuries had a stay of 3 weeks or beyond, while those with ICD tubes had to be inpatients beyond 1 week while their lungs recovered enough for the removal of the drainage tubes. One case underwent an SSG for a huge raw area and stayed for 30 days as an inpatient.

Second admissions needed for a staged surgical procedure (Closure colostomy and repair of rectovesical and vaginal fistula).

Weeks of Stay	Numbers	Percentage
< = 1 week	69	66
1 – 2 weeks	17	16
2 – 3 weeks	7	7
3 – 4 weeks	3	3
> 4 weeks	9	8

MANAGEMENT

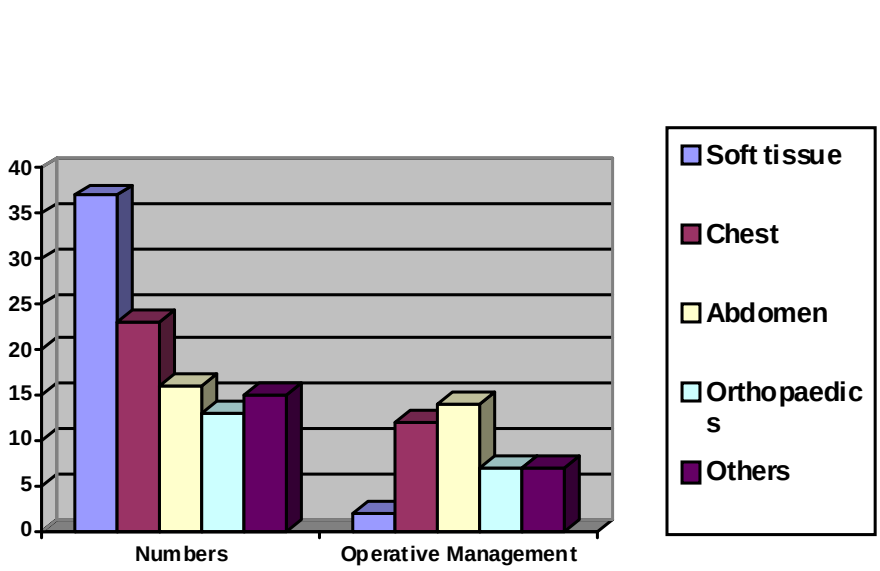
Among those admitted 61 cases (57%) were managed expectantly, with suturing, antibiotics and analgesics being the only therapy needed. There were two scrotal lacerations that were repaired primarily. Among the thoracic injuries 11 cases (50%) needed an ICD as part of their management while the others were either blunt injury chest wall or simple lacerations with no abnormality in the X ray.

There were two small bowel perforations, two ascending colon perforations, one transverse colon perforation and one caecal tear all of which were repaired primarily with no need of a protecting colostomy. In one case there was a sigmoid tear which was suture closed and the bowel exteriorized and returned to the abdomen at a later date. An inguinal laceration was explored, herniorrhaphy done and then closed. Four abdominal wall lacerations were suture closed and observed with good results, as there were no signs of peritoneal breach. There were three cases of bowel and omental prolapse that were explored and reduced, with other organs being normal. One case had a non expanding retroperitoneal hematoma and there was one liver laceration which was stutred primarily with an omental patch. Gastric wall I aceration with prolapse occurred in one case that was sutured primarily.

Among the orthopedic injuries, three clavicle fractures were treated with a figure of eight bandage, while those of the leg were managed by pop application, with one communited fracture needing external fixation for management. Three cases of fracture of vertebra succumbed to their injuries while 4 cases of femur fracture were

treated initially with upper tibial pin traction and later on by intra medullary nailing for fractures of the shaft or by DHS for trochanteric fractures. Upper limb factures in the form of bothbone fractures of the forearm were managed by POP application. There was a single case of public ramus fracture which was managed conservatively. SSG was done in one case with a pure soft tissue injury.

There was one basilica vein repair and one case of popliteal artery transaction which was grafted with native saphenous vein and femoro popliteal bypass was done. Dental extraction was needed in three cases because of fractured teeth and plastic eyelid suturing was needed in one case. Hemarthrosis aspiration was done in one case and a tracheostomy was needed for one case where there was laceration in the neck with exposed thyroid cartilage and an air sucking wound.



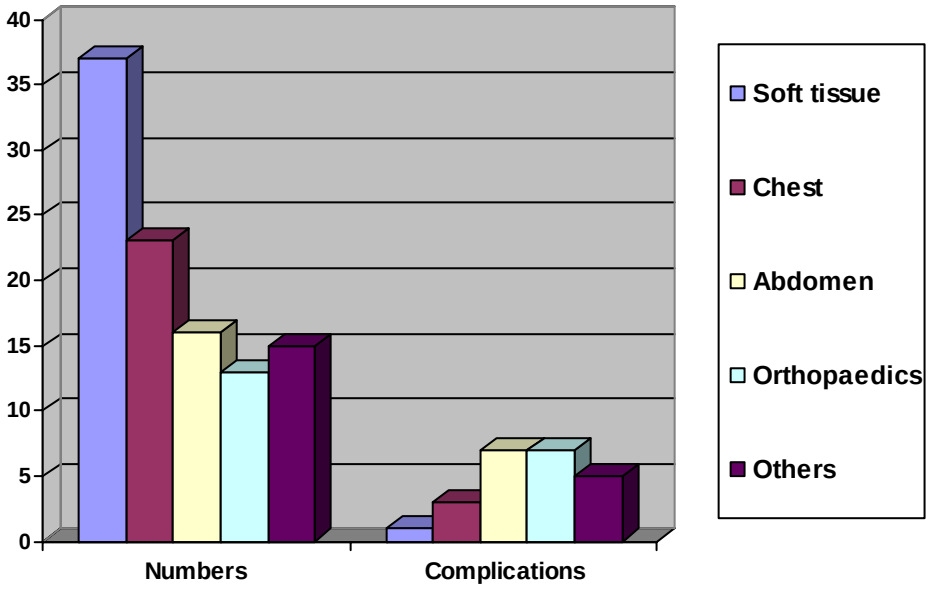
COMPLICATIONS

There were few complications associated with the operated cases, taking the form of surgical site infections (SS) in five patients with abdominal injuries that were managed conservatively and four SSI in the orthopedic group, again managed conservatively. Only one soft tissue injury case had secondary suturing for a wound infection. Generalized sepsis occurred in one case with an ascending colon perforation who succumbed to the same. In the eleven cases needing an ICD, two later had infection of the tract that needed debridement and antibiotics for treatment.

Among the other injuries, the patient with vascular repair of thepopliteal artery and the one theat underwent a cubital fossa exploration had post op edema that responded to limb elevation and anti inflammatory drugs, while the case where an inguinal exploration

with herniorrhaphy had a sinus from the prolene material that was later removed. All other cases had uneventful recovery and were discharged in due course.

Complications



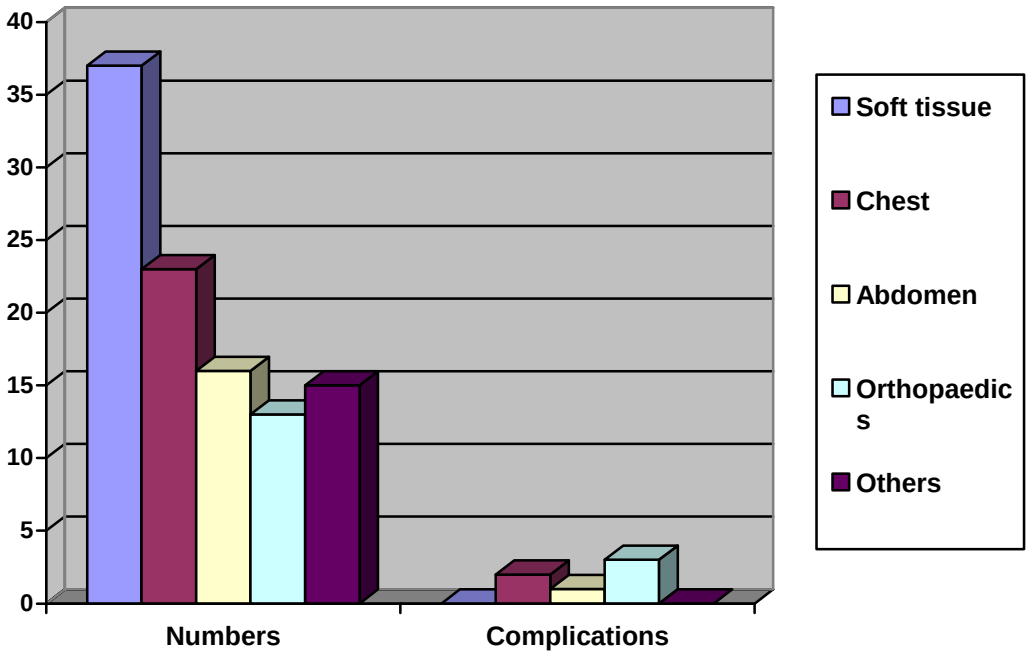
MORTALITY & MORBIDITY

There were six deaths in the study group, three of which were due to injuries to the spine as a result of indirect violence secondary to falls sustained during the event, one death in a case of ascending

colon perforation secondary to sepsis and two deaths due to thoracic trauma. All other cases were discharged after the requisite treatment was provided.

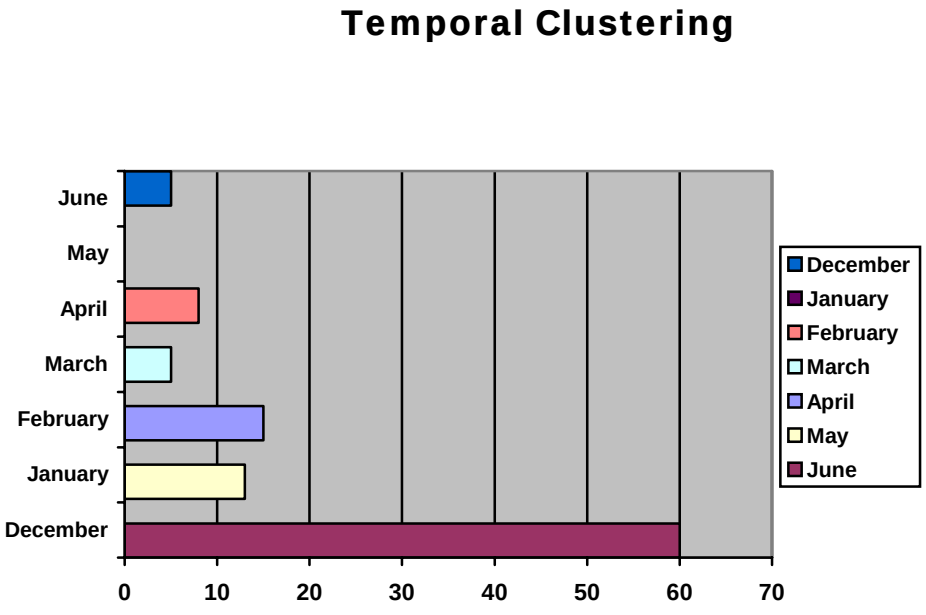
Though the mortality was low, the morbidity was high in cases with abdominal, thoracic and orthopedic injuries with long duration of stay and loss of quality of life during the period when they were bed hidden.

MORTALITY



CASE DISTRIBUTION

60% case occurred during the month of December because fo injuries sustained during farming and agricultural activiites as a result of contact with domesticated cattle.



CONCLUSION

- Males outnumbered females in the number of people injured by a retion of about 16:1
- Soft tissue injuries were the commonest type accounting for 35% of cases
- The people in their twenties and thirties formed more then 50% of the affected population
- The mortality due to bull gore injuries was about 6% in this study
- People with orthopedic and abdominal injuries were the ones with hospital stay period 3 weeks
- Spine fractures leading to shock was the commonest cause of death (50% of cases)
- Most of the cases (50%) showed a clustering during the month of December
- An operative management was needed in 37 cases (35%) while the rest of the cases were managed expectantly.

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PRO FORMA

1. Name | 2. Age | 3. Sex

4. I.P. Number | 5. Address

6. Date of Admission | 7. Date of Discharge | 8. Days of Stay

9. Participant / Spectator

10. Condition on Admission

i. Pulse

ii. BP

iii. RR

iv. GCS

11. List Injuries 12. Organs Involved 13. Injury Code

14. Operative / conservative Management 15. Management

16. Per operative findings 17. Complications 18. Outcome

19. Cause of Death 20. Post mortem findings

S. NO	I.P. NO	NAME	AGE / SEX	Days of Stay	Injury Sustained
1	1176	VIJAYA	32 / F	2	Laceration L Forearm
2	1223	SARASU	18 / F	33	Jejunal perforation closure
3	1325	PONNAMMAL	60 / F	28	Ileal tear sutured
4	1456	SAMANTHI	28 / F	33	Asc. Colon perforation closure
5	1723	KALA	18 / F	28	Caecal Perforation closure
6	1846	VENU	60 / M	12	Asc. Colon perforation closure
7	1976	MUNUSAMY	70 / M	24	Transverse colon tear closure
8	2388	AAMELU	40 / F	3	L Chest Laceration, sutured
9	2451	PRIYA	28 / F	4	Laceration L thigh, sutured
10	2522	PAUNAMMAL	50 / F	4	# L clavicle; Figure of eight bandage
11	2665	KALIMUTHU	35 / M	12	Sigmoid Tear, Suturign & Exteriorisation Done; follow up closure done
12	2723	CHELLAMMAL	50 / F	33	R Basotrochanteric #, UTPT. DHS Done
13	2981	KASI	20 / M	11	Omental tear suturing done
14	3004	ELUMALAI	50 / M	9	R parietal wall tear suturing done
15	3124	DHANALAKSHMI	28 / F	11	Omental tear suturign done
16	3214	UTHUKALLAN	60 / M	2	Laceration upper lip, abrasion chin, nose
17	3416	DHANANI	70 / F	16	L Hypochondrial omental prolapse, Retroperitoneal Hematoma, Laparotomy
18	3567	MUTHU	39 / M	3	Sutured wound 4 x 1 cm neck with abresio Contusion R Hip, Xray neck & Hip NBI
19	3676	VIJAYA	35 / F	14	Injury Chest Wall R ICD Done
20	3715	KUPPUSAMY	40 / M	2	Laceration 2 x1x1 cm nose
21	3823	DIVYA	20 / F	31	# L Shaft of Femur, UTPT, IM K Nail
22	3944	MANI	40 / M	2	Abrasion scalp, Contusion chest CXR NA

23	3998	RAJESWARI	35 / F	3	Sutured wound RIF 8x1cm
24	4015	KUMAR	38 / M	3	Laceration R cephalic & cubital veins, Brachioradialis m. laceration sutured & debrided
25	4285	RANI	40 / F	2	Sutured wound 3x1cm forehead
26	4375	PACHAIAPPAN	60 / M	33	Injury R Leg SSG Done
27	4405	KUPPAMMAL	60 / F	2	# L Tibia mid 1/3, AK Slab done
28	4496	KALAVATHY	38 / F	30	# Intertrochanteric L Femur, UTPT, DHS done
29	5107	ELUMALAI	65 / M	7	Sutured wound L forearm & L thigh
30	5223	PRAMILA	21 / F	2	Contusion R frontal region, chest & elbow Xray NBI
31	5301	PERIYASAMY	70 / M	2	Blunt Injury Back Xray LS Spine & Pelvis NBI
32	5454	SAROJA	32 / F	2	Sutured wound 2x1cm L loin xray abdome no air under diaphragm
33	5506	CHELLAPPAN	59 / M	3	Hemarthrosis L Knee aspiration, AK Slab Compression Bandage
34	5628	NAGAMMAL	49 / F	16	Chest laceration L ICD Done
35	5728	SIVAKALAI	35 / M	4	Laceration R Upper lip sutured
36	5869	ALAMELU	38 / F	1	L chest laceration, L pneumothorax, L ICD done
37	5901	RAJENDRAN	37 / M	4	Blunt injury chest CXR NAD
38	6041	DEEPA	21 / F	4	Sutured wound L parietal region
39	6178	RAMESH	28 / M	6	Laceration Chin, upper lip & face
40	6213	SARASWATHI	18 / F	1	Laceration L palm, sutured, Xray NBI
41	6334	MARRY	25 / M	2	Laceration 3x2cm R chest, CXR No # ribs
42	6451	ELAMMAL	60/ F	1	Contusion lip & bridge of nose
43	6578	YYAPPAN	49 / M	2	R upper lip laceration 2x1x1cm

44	6698	PICHAIMUTHU	50 / M	11	Laceration L chest wall, # 2nd rib, ICD don
45	6723	SIVAKAMI	25 / F	1	Laceration R chest Surgical emphysema CXR NAD
46	6898	SANKAR	65 / M	16	Laceration R cheek, L Lower Back Xray, H BNI
47	6971	NEELAVATHY	23 / F	4	Laceration L eyebrow & below R eye, sutured
48	7123	PRABHU	35 / M	1	Laceration, Knee, Xray NAD
49	7214	KAVITHA	20 / F	2	Burst # D11, Subluxation D11, D12
50	7381	YYANAR	60 / M	6	Laceration R chest, surgical emphyserna, CXR NAD
51	7456	CHELLAMMAL	50 / F	11	B/L Loss of upper lateral & central incisors
52	7513	NAGARATHINAM	47 / F	6	# BB Forearm R mid 1/3, # Wedge Compression L2 vertebra
53	7874	SIVA	47 / M	2	Laceration scrotum, sutured
54	7998	GOVINDHAMMAL	50 / R	30	# R Leg BB compound Grade III A Extern Fixation
55	8046	PRIYANKA	17 / F	4	Laceration Scrotum, sutured
56	8504	SELVI	28 / F	7	# L Clavicle Figure of eight bandage
57	8683	ELUMALAI	40 / M	4	Laceration below R eye
58	8713	DHARANIDHARAN	38 / M	11	Laceration R chest, R ICD Done
59	8998	ASHOK KUMAR	355 / M	1	Laceration R elbow 8x1cm
60	9417	JEYA	35 / F	1	Laceration R elbow xray NBI
61	9586	KARPAGAM	58 / F	11	Sutured wound R thigh 8 cm
62	10233	INDURANI	45 / F	4	Laceration upper lip, # R upper incisor
63	11974	SELVI	27 / F	11	Lung exposed R chest laceration, R ICD Done
64	13173	PONNAMAL	60 / F	2	Sutured wound back 2x1cm, contusion R Knee Xray NBI

65	14166	MANIKANDAN	28 / M	17	# R Leg BB communited; Closed reductio AK slab done
66	16171	SENTHIL	39 / M	5	Laceration R chest, No # nbs / heamo/pneumo thorax
67	17806	KALA	35 / F	1	Laceration R Forearm Sutured
68	23733	DHANALAKSHMI	70 / F	3	Laceration R scapula Abrasion L forearm, knee L forehead
69	27553	DEEPA	35 / F	1	Laceration R Thigh, Sutured
70	29105	NAVANEEDHAM	29 / F	2	Blunt Injury Chest CXR NAD
71	29306	SIVAKAMI	27 / F	4	Laceration 4x3x2cm L leg Xray NBI
72	31044	PICHIAMMAL	50 / F	2	Laceration R Hypochondnum Xray No Air under diaphragm no # ribs
73	32031	PRIYA	20 / F	1	Laceration R Jaw, Laceration R Chest Infraclavicular Region
74	33929	JANAKI	49 / F	2	Laceration R Thigh
75	34295	AVARAYI	21 / F	3	Laceration R chest, R frontal haematoma, heamatoma evacuated CT NAD, CXR NA
76	34403	CHENNAPPAN	67 / M	4	Laceration R angle of mouth and R forehead, Abrasion R leg, R forearm, Loss tooth
77	34998	VENU	60 / M	33	R intertrochanteric Femur #, ORIF & DXR NAD
78	35417	INDIRA	45 / F	2	Laceration R elbow 5x5x2 cm
79	35995	PATCHAIMMAL	34 / F	2	Laceration R elbow
80	37052	GOPAL	70 / M	9	Chest Injury R ICD Done
81	37122	JEYA	42 / F	1	Contusion R Leg
82	38460	BAKIAM	50 / F	3	# L Clavicle; Figure of eight bandage with collar & cuff
83	39057	NARAYANAN	35 / M	4	Blunt Injury Chest & Abdomen CXR NAD
84	40909	PANCHALAI	45 / F	31	# Both pubic rami B/L, Bladder catheterise clear urine drained, USG N study

85	41039	ALAMELU	48 / F	5	Dislocation C6 C7, Skull Traction
86	41079	MUNUSAMY	45 / M	4	Laceration R Forearm Sutured
87	41170	BOOPALAN	30 / M	8	Laceration R Inguinal Region, Exploration Herniorraphy done
88	41780	KALIAMMAL	28 / F	5	Laceration of L eyelid involving tarsal plat layered suturing of eyelid
89	42912	JEYA	35 / F	1	Laaceration L hand Sutured
90	44035	PERUMAL	80 / M	4	Scalp Laceration Sutured. CT Brain NAD
91	44407	KALA	70 / F	1	Laceration Anterior Scrotal frenulum 4x1x1cm, Laceration Shaft of penis 1x1cm
92	44409	MUNIYAMMAL	28 / F	5	Laceration R elobow
93	44661	KUMAR	40 / M	11	Bowel & Omental Prolapse, Bowe & other viscera N, contusion lieal mesentery
94	45528	REETH	30 / F	5	Laceration r Thigh
95	45750	CHINNASAMY	74 / M	3	Laceration L Chest wall CXR NAD
96	47002	KOMALA	40 / F	11	Chest Injury R ICD Done
97	47037	RAJAN	71 / M	11	Chest injury R ICD Done
98	47076	SARASWATHY	60 / F	4	Laceration L chest no # ribs / haemo / pneumo thorax
99	47100	CHELLAN	62 / M	6	Laceration R Thigh, Doppler Done Nil pathology
100	47180	NAGAMMAL	70 / F	15	L Chest laceration 5 x 3 cm ICD Doen # 2,3,4 ribs

INJURY CODING

1 - Skin and Soft Tissue

2 - Thoracic injuries

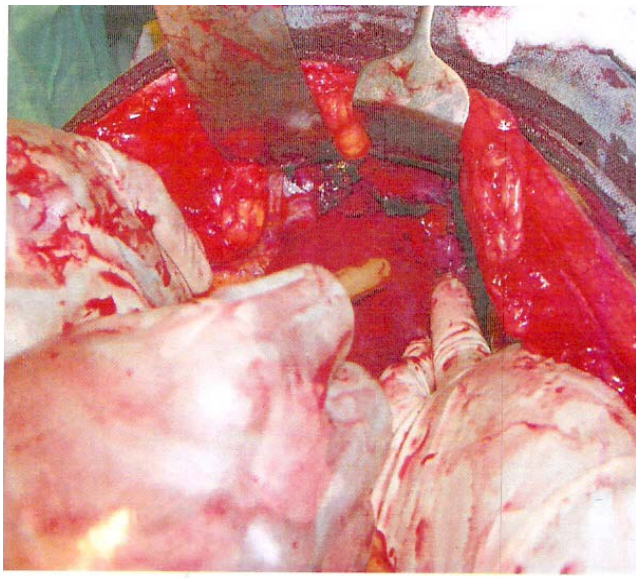
3 - Abdominal Injuries

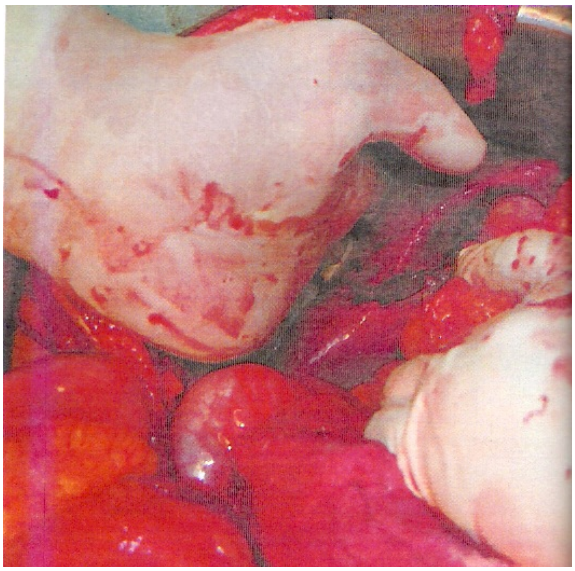
4 - Orthopedic Injuries

5 - Others

Bull Gore – Soft Tissue Injuries

Liver Laceration



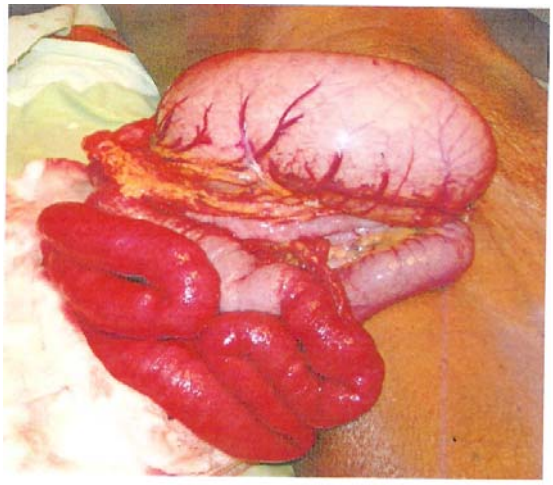


Tracheal Injury

soft tissue injuries

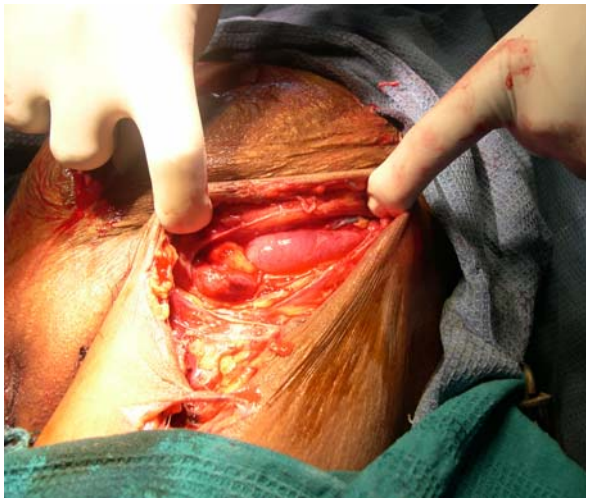
Bull Gore – Bowel Prolapse Bull Gore Stomach Prolapse

Gore – Omental Prolapse



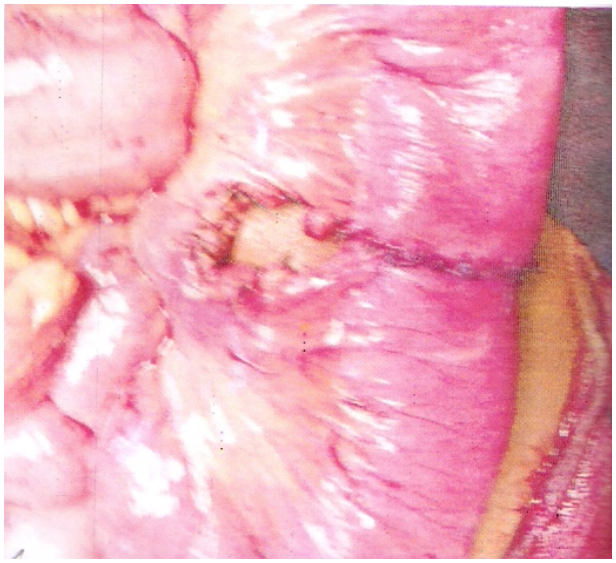
Bull Gore – Stomach & Bowel Prolapse

Bul l

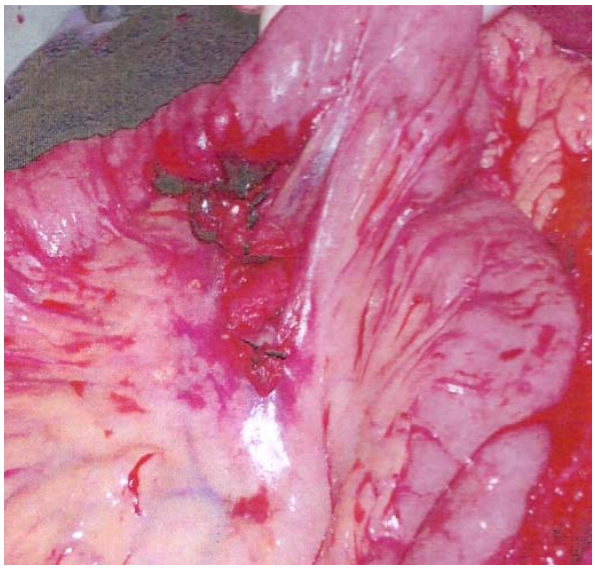


Multipel Tears in Ileum and Mesentery

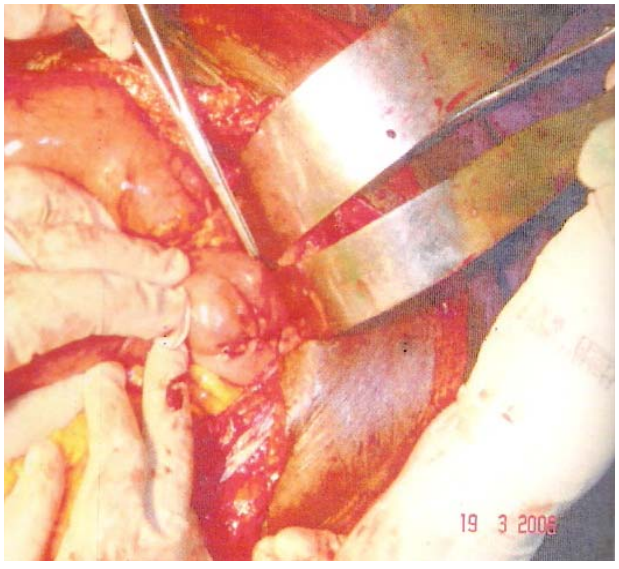
Two Layer Anastomoses



Mesenteric Tear



Gastric Tear Sutured



Bull Gore Injury Chest

Bull Gore Chest

Perineal Injuries